IME-5 Program
Marriott Denver West

National Renewable Energy Laboratory

25 Years of Research Excellence 1977-2002

Registration/Reception/Poster Set-Up (August 5, 2002) Poster Set-Up & Registration 3:00–5:00 p.m. Reception 5:00-7:00 p.m.		
Opening - Session 1 – Tuesday Morning (August 6) – Chair, Claes Granqvist		
07:00	**Registration and Continental Breakfast**	Assembly Area (near meeting room)
08:10	**Opening Remarks**	Admiral Richard Truly, NREL Director
08:20	**Introductions**	Satyen Deb, NREL Conference Chair, USA
08:40	Smart Windows for Intelligent Buildings: *Energy Performance Perspectives for Switchable Chromogenic Materials*	S. Selkowitz, LBNL, USA
09:00	The Coming of Smart Glass – *The Role of Electrochromics and other Switching Technologies*	C. Lampert, Star Science, USA
09:20	Electrochromic Devices on Polyester Foil	A. Azens, Uppsala University, SWEDEN
09:40	Gas-chromic Glazings with a Large Dynamic Range in Total Solar Energy Transmittance	V. Wittwer, Fraunhofer Institute, GERMANY
10:00	**Morning Break**	
Morning – Session 2		**Chair, Volker Wittwer**
10:20	Optical, Electrical and Electrochromic Performance of Tungsten Oxide Films with Varying Structure and their Devices	P.V. Ashrit, Universite de Moncton, CANADA
10:40	Nanometer-Scale Investigation of Electrochromic Films using Novel Technique of Scanning Near-Field Optical Microscopy	F. Iwata, Shizuoka University, JAPAN
11:00	Molecular Vibration of Tungsten Oxide Thin Films for Electrochromic Devices	V. Teixeira, University of Minho, PORTUGAL
11:20	Influence of the Porosity of RF Sputtered Ta_2O_5 Thin Films on their Optical Properties for Electrochromic Applications	C. Corbella, Universitat de Barcelona, SPAIN
11:40	Influence of the Lithium Insertion on the Infrared Properties of o-$WO_3.H_2O$.	A. Bessiere, LCAES-ENSCP, FRANCE
12:00	**LUNCH – PROVIDED**	
Afternoon - Session 1		**Chair, David Rauh**
1:00	Optical Absorption of Li-intercalated Polycrystalline Tungsten Oxide Films: Comparison to Large Polaron Theory	A-L. Larsson, Uppsala University, SWEDEN
1:20	Simulation of Ion Insertion in Thin Layer Electrodes	M. Sedlarikova, Inst. of Electrotechnology, CZECH REP
1:40	Oxygen Vacancy in Cubic WO_3 Studied by First-Principles Pseudopotential Calculation	S. Karazhanov, NREL, USA
2:00	Optical Absorption Process and Durability under Electrochemical Cycling of Sputtered Amorphous Tungsten Oxide Films	L. Berggren, Uppsala University, SWEDEN
2:20	Intercalation Process in WO_3 and WO_3:Li+ Thin Films	L. Bulhoes, Univ. de Sao Carlos, BRAZIL
2:40	**Afternoon Break**	
Afternoon – Session 2		**Chair, Tom Richardson**
3:00	Preparing Mesoporous Tungsten Oxide Thin Films using Non-Ionic Surfactants as the Templates by Sol-Gel Deposition Process	E. Ozkan, Istanbul Technical Univ., TURKEY
3:20	Sol-Gel Derived Precursor Materials for Electrochromic WO_3 Films: A Comparison	S.A. Agnihotry, Nat'l Phys. Lab, INDIA
3:40	Sol-Gel Fabricated Large Area, Spherically Bonded Electrochromic Modules	T. Traulsen, Instit. fur Neue Materialien, GERMANY
4:00	Performance Problems of Electrochromic Devices Based on Ion Insertion Phenomena	A. Lusis, University of Latvia, LATVIA
4:20	Degradation of Solid State Electrochromic Devices	C. Person, Universitat de Barcelona, SPAIN
4:40	Sol-Gel Tungsten Oxide and Vanadium Doped Tungsten Oxide Films	I. Turhan, Istanbul Tech. Univ., TURKEY

Session 1 - Wednesday, Morning (August 7)		Chair, Kuo-Chuan Ho
07:30	**Continental Breakfast**	Assembly Room – Near Meeting Room
08:00	Improving the Durability of Ion Insertion Materials in a Liquid Electrolyte	S.H. Lee, NREL, USA
08:20	XP and IR Spectroscopic Studies of Transparent $InVO_4$ Films upon Li Charge-Discharge Reactions	F. Decker, University of Roma, ITALY
08:40	Performance and Durability of Electrochromic Windows with Carbon-based Counterelectrode and their Applications in Architectural and/or Automobile Fields	T. Kubo, Nippon Mitsubishi Oil Corp., JAPAN
09:00	Electrochromic and Composition Relationship in Antimony Tin Oxide (ATO) Thin Films Grown by Pulsed Laser Deposition	A. Rougier, Universite de Picardie Jules Verne, FRANCE
09:20	Sol-Gel Thin-Films for Neutral Colour Electrochromic Windows	S.A. Impey, Cranfield University, U.K.
09:40	**MORNING BREAK**	
Morning - Session 2		**Chair, Junichi Nagai**
10:00	Comparison of Optical and Electrochromic Properties of Nb_2O_5 and WO_3 Doped Nb_2O_5 Thin Films	E. Pehlivan, Istanbul Technical University, TURKEY
10:20	Ion-Exchange Processes on the Contact Oxide/Electrolyte under the Electrochromism in Nb_2O_5 Films	L. Skatkov, ISRAEL
10:40	R.F. Sputtered Electrochromic V_2O_5 Films	A. Pennisi, Universita di Catania, ITALY
11:00	Raman Spectroscopic Studies of Amorphous Vanadium Oxide Thin-Films	S.-H. Lee, NREL, USA
11:20	Characterization of Electrodeposited Ce-Co Mixed Oxide Nano Structured Thin Films for Transparent Electrodes for EC Devices	T. Yoshino, Tokyo Metropolitan Univ., JAPAN
11:40	Electrochromic Characteristics of CeO_2 Deposited by E-Beam PVD	I. Porqueras, Universitat de Barcelona, SPAIN
12:00	**LUNCH – PROVIDED**	
Afternoon – Session 1		**Chair, Boris Orel**
1:00	RF Sputtering Deposition of Ag Doped ITO Coatings at Room Temperature	C. Corbella (for A. Pinyol), Universitat de Barcelona, SPAIN
1:20	Molecular Properties of Partially Substituted Nickel Oxide Clusters	J. Nagai, Chromogenics Lab, JAPAN
1:40	Electrochemical and Electrochromic Behavior of Nickel Oxide Thin Films Grown by Pulsed Laser Deposition	A. Rougier, Universite de Picardie Jules Verne, FRANCE
2:00	Electrochromic Response Speed of the Electrochromic Device using Ta_2O_5 Layer	Y.E. Sung, K-JIST, S. KOREA
2:20	Composite Au-NiO Films	F.F. Ferreira, Instituto de Fisica, BRAZIL
2:40	Optimized Nickel Oxide Electrochromic Films	E. Avendano, Uppsala University, SWEDEN
3:00	**AFTERNOON BREAK**	
3:20		
		[SEE POSTER APPENDIX]
5:00	**ADJOURN**	
6:00	**Banquet Dinner and Cello Recital by Neena Deb-Sen**	**Marriott Denver West**

Session 1 - Thursday, Morning (August 8)		Chair, Jiri Vondrak
07:30	**Continental Breakfast**	Assembly Room – Near Meeting Room
08:00	Electrochromic Star Polymers	R. D. Rauh, EIC Laboratories, USA
08:20	Control of Electrochromic Properties through Structural Modification in Dioxythiophene (PXDOT) and Dioxypyrrole (PXDOP) Based Polymers	B. Thompson, University of FLORIDA
08:40	Electrochromic Devices Based on Dual Conducting Polymers	A. Argun, University of FLORIDA
09:00	Photo and Electrochemical Properties of EC Devices Using Donor Acceptor-Type Electrochromic Molecules of Viologen Derivatives and their UV resistance	T. Kubo, Nippon Mitsubishi, JAPAN
09:20	An Indium Hexacyanoferrate-Tungsten Oxide Electrochromic Battery with a Hybrid K^+/H^+- Conducting Polymer Electrolyte	T.S. Tung, Nat'l TAIWAN University
09:40	**Morning Break**	
Morning – Session 2		**Chair, Harlan Byker**
10:00	PMMA Based Aprotic Gel Electrolytes	J. Vondrak, Institute of Inorganic Chem., CZECH REP
10:20	The Influences of Operating Voltage and Cell Gap on the Performance of a Solution-Phase Electrochromic Device Containing HV and TMPD	Y.C. Hsu, National TAIWAN University
10:40	Phthalocyanines and Related Compounds as Switchable Materials upon Strong Irradiation: The Molecular Engineering behind Optical Limiters	D. Dini, University of Tubingen, GERMANY
11:00	Photoinduced Electrochromism of Conducting Polyaniline for Photorewritable Imaging	N. Kobayashi, Chiba University, JAPAN
11:20	Photochromic Properties of WO_3 and WO_3:X (X=Ti, NB, Ta and Zr) Thin Films	L. Bulhoes, Univ. de Sao Carlos, BRAZIL
11:40	**LUNCH – PROVIDED**	
Afternoon – Session 1		**Chair, Carl Lampert**
1:00	The Black State in Mg_2NiH_x Thin Films	W. Lohstroh, Vrije University, The NETHERLANDS
1:20	The Physics of Variable Reflectance Mg_2NiH_x Films	R. Griessen, Vrije University, The NETHERLANDS
1:40	New Switchable Mirror Systems	T.J. Richardson, LBNL, USA
2:00	Reversible Electrochemical Mirror (REM) Smart Windows	D.M. Tench, Rockwell Scientific Co., USA
2:20	Electrochromic Displays Based on Nanostructured Films	D. Corr, Ntera, IRELAND
2:40	The Black State of RE-Mg-Hydride Switchable Mirrors	I.A.M.E. Giebels, Vrije University, The Netherlands
3:00	**Afternoon Break**	
Afternoon – Session 2		**Chair, Ronald Griessen**
3:20	Production and Performance of Suspended Particle Device (SPD) Products	J. Harary, Research Frontiers, Inc., USA
3:40	Preparation and Structural Studies of Sol-Gel Derived Redox Electrolytes for Electrochromic and Dye-Sensitized Photoelectrochemical Cells	B. Orel, Nat'l Institute of Chemistry, SLOVENIA
4:00	Solid-State Photoelectrochromic Device	U. Krasovec, Fraunhofer Institute, GERMANY
4:20	Characteristics of White Electrochromic Device Using Zinc Compounds	N. Kashiwazaki, Tokyo Denki University, JAPAN
4:40	Electrochromic Displays by Laser-Structuring of Sol-Gel Fabricated Thin-Films	A. Rueff, Institut fur Neue Materialien (INM), GERMANY
5:00 ADJOURN and Poster Tear Down **NOTE: Posters Not Removed by 9:00 p.m. will be discarded.**		

Friday, August 9		
8:00	**PANEL DISCUSSION – All Conference Attendees Welcome** Sponsored by the DOE Office of Building Technologies Advanced Windows Research	**"The Future Vision for Electrochromics and Related Technologies"** **NREL Visitors Center Conference Room**
10:00	**NREL Facilities Tours** SERF (10:00 – 10:40): Building Tour, PV Laboratories, BS Laboratories FTLB (10:45 – 11:30): Electrochromics Measurement and Testing Facilities OTF (11:35 – 12:00): Outdoor and Accelerated Test Facilities	**Non-U.S. Citizens must have Foreign National Data Cards submitted prior to the conference and bring passports.**

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Posters – Appendix	
Optical and Electrochromic Properties of RF Reactively Sputtered WO_3 Thin-Films	Y. Abe, Kitami Inst. Of Tech., JAPAN
Influence of Water on the Electrochromic Properties of Sol-Gel Electrodes and Devices	M.A. Aegerter, Institute fuer Neue Materialien, GERMANY
Electrochromic Properties of SnO_2 incorporated Ni Oxide Films Grown Using a Co-Sputtering System	K.-S. Ahn, KJIST, KOREA
New Concepts for the Realization of Flexible Materials with Tuneable Emissivity	L. Beluze, LCAES-ENSCP, FRANCE
Sputter-Deposited $LiNiO_2$ and V_2O_5 Nanocrystalline Thin-Films as Counterelectrodes for Lithium-Working Electrochromic Devices	C. Brigouleix, CEA, FRANCE
Preparation and Structural Investigations of Electrochromic Nanosized NiO_x Films made via the Sol-Gel Route	P. Bukovec, NIC, SLOVENIA
Electrodeposition of Lead on ITO Electrode: Influence of Copper as Additive	L. Bulhoes, LIEC, BRAZIL
Characterizations of Mixed Bi/V Oxide Films, Deposited via Sol-Gel Route, Utilized as Electrodes in Asymmetric Liquid Crystal Cells	E. Cazzanelli, Universita della Calabria, ITALY
X-ray Absorption Spectroscopy of Transition Metal Hydride Films for Switchable Mirrors	B. Farangis, LBNL, USA
Research Frontiers (Table)	J. Harary
Switching Behavior of the Prussian Blue-Indium Hexacyanoferrate Electrochromic Device Using a K+- Doped Solid Polymer Electrolyte	K.-C. Ho, National TAIWAN University
Current State of the Art of NMOC-AGC Electrochromic Windows for Architectural and/or Automobile Applications	T. Kubo, Nippon Mitsubishi, JAPAN
Electrochromism of Amorphous Ruthenium Oxide Thin-Films	S.-H. Lee, NREL
Electrochromic and Chemochromic Performance of Mesoporous Thin-Film Vanadium Oxide	P. Liu, NREL
The Effect of Tantalum Oxide Films on Stability and Memory Effect in the Electrochromic Tungsten Oxide Films	Y.-C. Nah, KJIST, KOREA
Electrochromic Cell with an $I^-/I3^-$ Redox Semi-Solid Sol-Gel Electrolyte	B. Orel, Nat'l Inst. Of Chemistry, SLOVENIA
Ex-Situ IR Transmission Spectroscopic Investigation of Crystalline V_2O_5 Thin-Films	B. Orel, Nat'l Inst. Of Chemistry, SLOVENIA
Fiber-Optic Hydrogen Sensors Based upon Chromogenic Materials	J. R. Pitts, NREL
On the Electrochromism of Nb_2O_5 Anode Films under Pulse Electrochemical Polarization	L. Skatkov, ISRAEL
Thermooptical Properties of the Thermochromic Vanadium Dioxide Thin-Films	L. Sauques, DGA/CTA, FRANCE
Durability Testing of Electrochromic Windows at NREL via the ASTM E2141-01 Standard	C.E. Tracy, NREL